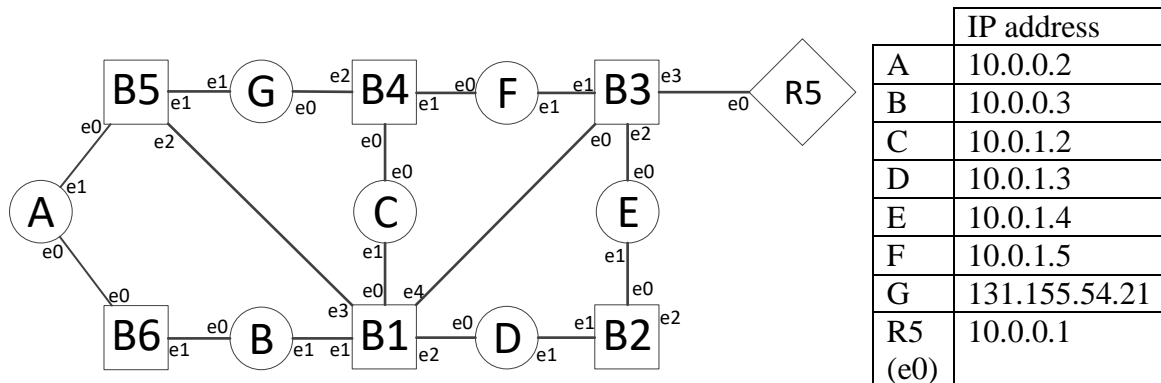
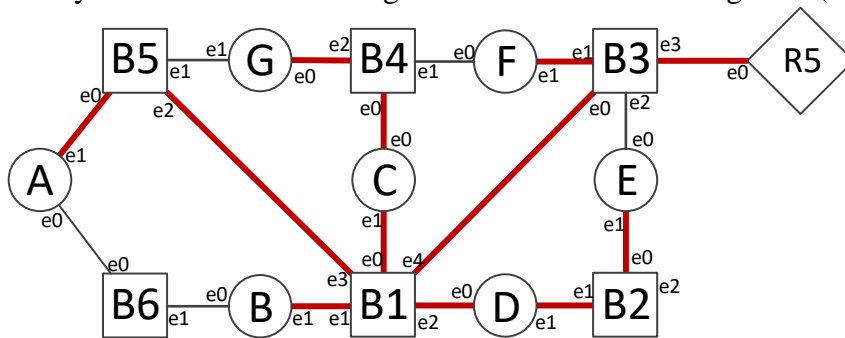


Question 4

The figure below illustrates a L2 network of one router, 6 switches and 7 terminals. The distance of the link between two L2 elements is 1. Assume the distance of the link between a terminal and a bridge is 0. R5 is the gateway of the L2 network. The table next to the figure shows the IP addresses of the L3 elements. Answer the following questions:



- A. Use the spanning tree algorithm and draw the spanning tree built on these bridges. Justify the exclusion of a bridge or link from the resulting tree. (2 points)



- B. Terminal G has an IP address significantly different from the remaining terminals. Provide the partial routing table of R5 after CIDR that would allow routing packets to this L2 network. Which problem does the IP address of G pose to R5? (1 points)

Prefix	Mask	Port
10.0.0.0	/23	e0
131.155.54.21	/32	e0

If CIDR would merge those two addresses, it would replace them to a 0.0.0.0/0. In this case, R5 would route any packet to an unknown address back to the local area network even if the packet was originated by that local network.

- C. Change IP address of G to address the problem and update the routing table of R5. (1 points)

G: 10.0.0.4

Prefix	Mask	Port
10.0.0.0	/23	e0

- D. Assume the ARP tables of the 7 terminals and R5 are empty. Terminal A needs to send an IP packet to terminal G. Fill in the following table with all the packets generated in the whole network because of this request. (2 points)

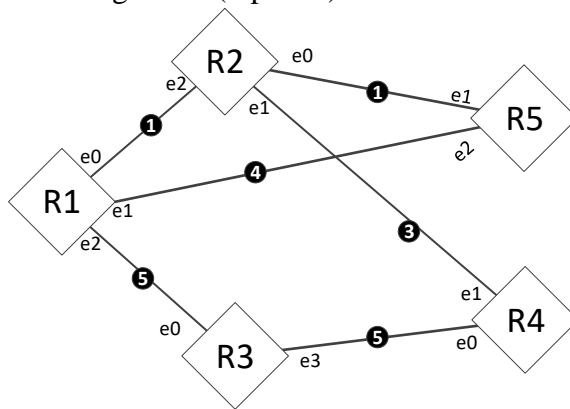
It is assumed that the forwarding tables are also empty.

From	To	Protocol	Remarks on data transferred in packet
A	B5	ARP	Return MAC address of IP=131.155.54.21
B5	B1	ARP	Return MAC address of IP=131.155.54.21
B1	B	ARP	Return MAC address of IP=131.155.54.21
B1	B4	ARP	Return MAC address of IP=131.155.54.21
B1	B3	ARP	Return MAC address of IP=131.155.54.21
B1	B2	ARP	Return MAC address of IP=131.155.54.21
B4	G	ARP	Return MAC address of IP=131.155.54.21
B3	F	ARP	Return MAC address of IP=131.155.54.21
B3	R5	ARP	Return MAC address of IP=131.155.54.21
B2	E	ARP	Return MAC address of IP=131.155.54.21
G	B4	ARP	Here the e0 MAC address of IP=131.155.54.21
B4	B1	ARP	Here the e0 MAC address of IP=131.155.54.21
B1	B5	ARP	Here the e0 MAC address of IP=131.155.54.21
B5	A	ARP	Here the e0 MAC address of IP=131.155.54.21

- E. Once the above request is finished, router R5 wants to send an IP packet to terminal A. Fill in the following table with all the packets generated in the whole network because of this request. (2 points)

From	To	Protocol	Remarks on data transferred in packet
R5	B3	IP	The actual IP packet framed towards MAC of e1 of A
B3	B1	IP	The actual IP packet framed towards MAC of e1 of A
B1	B5	IP	The actual IP packet framed towards MAC of e1 of A
B5	A	IP	The actual IP packet framed towards MAC of e1 of A

- F. Assume that router R5 participates in the L3 network below. If all routers operate with *link state routing* and LSPs have TTL=2, execute Dijkstra algorithm on R5. Fill in the following table. (2 points)



Dijkstra algorithm steps

Confirmed list	Tentative list
(R5, 0, -)	(R2, 1, R2) (R1, 4, R1)
(R5, 0, -) (R2, 1, R2)	(R1, 4, R1)
(R5, 0, -) (R2, 1, R2)	(R1, 4, R1) (R4, 4, R2) (R1, 2, R2)
(R5, 0, -) (R2, 1, R2)	(R4, 4, R2) (R1, 2, R2)
(R5, 0, -) (R2, 1, R2) (R1, 2, R2)	(R4, 4, R2)
(R5, 0, -) (R2, 1, R2) (R1, 2, R2)	(R4, 4, R2) (R3, 7, R2)
(R5, 0, -) (R2, 1, R2) (R1, 2, R2) (R4, 4, R2)	(R3, 7, R2)
(R5, 0, -) (R2, 1, R2) (R1, 2, R2) (R4, 4, R2)	(R3, 7, R2) (R3, 9, R2)
(R5, 0, -) (R2, 1, R2) (R1, 2, R2) (R4, 4, R2)	(R3, 7, R2)
(R5, 0, -)	-
(R5, 0, -) (R2, 1, R2) (R1, 2, R2) (R4, 4, R2) (R3, 7, R2)	